

CLAIMS

What is claimed is:

1. A system for processing a workpiece, comprising:

5 a process chamber;

a workpiece support in the process chamber; and

at least one fluid delivery element in the process chamber, with the fluid delivery element rotatable around the workpiece support for delivering a process fluid toward the workpiece support.

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2. The system of claim 1 wherein the fluid delivery element comprises at least one spray arm having a plurality of spray nozzles thereon.

3. The system of claim 2 wherein the fluid delivery element comprises two spray arms located on opposite sides of the workpiece support.

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4. The system of claim 1 wherein the workpiece support is attached to an inner wall of the process chamber.

20 5. The system of claim 1 further comprising a fluid supply system having a fluid supply valve for delivering a process fluid to the fluid delivery element.

6. The system of claim 5 further comprising a rotary union connecting the fluid supply valve to the fluid delivery element, with the rotary union including a hollow shaft through which a process fluid may travel.

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7. The system of claim 6 further comprising a fluid delivery line in the hollow shaft through which a process fluid may travel.

8. The system of claim 1 further comprising a sonic transducer in the
10 process chamber for providing sonic energy to the workpiece.

9. The system of claim 1 further comprising a motor linked to the fluid delivery element for rotating the fluid delivery element.

15 10. The system of claim 1 further comprising at least one of a process gas manifold, a process vapor manifold, and a rinsing liquid manifold in the process chamber for delivering a process gas, a process vapor, and/or a rinsing liquid into the process chamber.

11. The system of claim 1 wherein the process chamber is sealed such that the process chamber is liquid tight.

12. The system of claim 1 further comprising a drain in the process
5 chamber for draining fluid from the process chamber.

13. The system of claim 1 further comprising a removable door on the process chamber.

10 14. A system for processing a workpiece, comprising:
a process chamber;
a stationary workpiece support in the process chamber;
fluid delivery means in the process chamber for directing a process fluid toward the stationary workpiece support, with the fluid delivery means
15 continuously rotatable around the stationary workpiece support; and
rotation means for rotating the fluid delivery means.

15. The system of claim 14 wherein the stationary workpiece support comprises a cantilevered arm attached to an inner wall of the process
20 chamber.

16. The system of claim 14 wherein the stationary workpiece support includes a plurality of grooves, with each groove configured to receive a workpiece.

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17. The system of claim 14 wherein the stationary workpiece support is adapted to support a workpiece carrier.

18. The system of claim 14 wherein the fluid delivery means comprises a plurality of rotatable spray manifolds arranged around the stationary workpiece support for directing a process fluid from a plurality of directions toward the stationary workpiece support.

19. The system of claim 14 wherein the rotation means comprises a hollow motorized rotary shaft, with the rotatable fluid delivery means connected to the rotary shaft.

20. The system of claim 14 further comprising at least one of a process gas delivery means, a process vapor delivery means, and a rinsing liquid delivery

means in the process chamber for delivering a process gas, a process vapor, and/or a rinsing liquid into the process chamber.

21. A method of processing a workpiece, comprising the steps of:

5 placing a workpiece onto a stationary workpiece support in a process

chamber;

rotating a fluid delivery element around the workpiece; and

directing a process fluid from the fluid delivery element onto the workpiece while the fluid delivery element rotates.

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22. The method of claim 21 further comprising the step of introducing a process gas or vapor into the process chamber.

23. The method of claim 21 further comprising the step of providing sonic

15 energy to the workpiece.

24. The method of claim 21 further comprising the step of sealing the process chamber with a process chamber door.

25. The method of claim 21 further comprising the step of introducing a rinsing liquid into the process chamber to immerse the workpiece in the rinsing liquid.

5 26. The step of claim 25 further comprising the steps of draining the rinsing fluid from the process chamber and introducing at least one of a drying gas and an organic vapor into the process chamber to facilitate removal of the rinsing liquid from the workpiece.

10 27. A system for processing workpieces, comprising:

an interface section having multiple workpiece holding positions;
a process section having one or more workpiece processors;
a process robot moveable between the interface section and the process section, for moving workpieces between them;
and with at least one of the workpiece processors comprising:
a process chamber;
a workpiece support in the process chamber; and
a fluid delivery element in the process chamber rotatable around the workpiece support for delivering a process fluid toward the workpiece
20 support.